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SECTION 07 41 13
METAL ROOF PANELS

Morin Metal Panels
Exposed Fastener Metal Roof Panels

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Exposed fastener single element metal roof panels.
- B. Board Insulation.
- C. Accessories including fasteners, perimeter trim and penetration treatments.

1.2 REFERENCES

A. ASTM International

- 1. ASTM A240; Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- 2. ASTM A666; Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- 3. ASTM A792 – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- 4. ASTM B117; Standard Practice for Operating Salt Spray(Fog) Apparatus.
- 5. ASTM B209; Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- 6. ASTM B370; Standard Specification for Copper Sheet and Strip for Building Construction.
- 7. ASTM C645 – Standard Test Method for Nonstructural Steel Framing Members.
- 8. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
- 9. ASTM C1311; Standard Specification for Solvent Release Sealants.
- 10. ASTM D522; Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
- 11. ASTM D523; Standard Test Method for Specular Gloss.
- 12. ASTM D968; Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.
- 13. ASTM D1308; Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
- 14. ASTM D2244; Standard practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

15. ASTM D2247; Standard Practice for Testing Water Resistnace of Coatings in 100% Relative Humidity.
16. ASTM D2794; Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
17. ASTM D3359; Standard Test Methods for Measuring Adhesion by Tape Test.
18. ASTM D3363; Standard Test Method for Film Hardness by Pencil Test.
19. ASTM D4145; Standard Test Method for Coating Flexibility of Prepainted Sheet.
20. ASTM D4214; Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
21. ASTM D5894; Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
22. ASTM E283; Standard Test Method for determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors under Specified Pressure Differences across the Specimen.
23. ASTM E331; Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
24. ASTM G153; Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials.
25. ASTM G154; Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.

B. German Institute for Standardization (DIN)

1. DIN EN988; Specifications for zinc and zinc alloy rolled flat products for building.
2. DIN EN1179; Zinc and Zinc alloys – Primary Zinc.

1.3 SUBMITTALS

- A. Refer to Section [01 33 00 Submittal Procedures] [Insert section number and title].
- B. Product Data: Submit manufacturer current technical literature for each type of product.
- C. Shop Drawings - Submit detailed drawings showing:
 1. Profile
 2. Gauge of panel
 3. Location, layout and dimensions of panels
 4. Location and type of fasteners
 5. Shape and method of attachment of all trim
 6. Locations and type of sealants
 7. Installation sequence.

8. Other details as may be required for a weathertight installation
- D. Samples: Provide nominal 3 x 5 inch of each color indicated. [Provide panel width by 10 inches long minimum] [Insert size].
- E. LEED Submittals:
 1. Sustainable Sites (SS)
 - a. Product Test Reports or current product listing on <http://www.energystar.gov> for Credit SS 7.2: For insulated metal roof panels, indicating that panels comply with Solar Reflectance Index (SRI) requirement.
 2. Material and Resources (MR)
 - a. Product Certificates for Credit **[MR 4]** [MR 4.1 [and Credit MR 4.2]]: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
- F. Quality Assurance Submittals
 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with requirements.
 2. Manufacturer Erection Instructions: Provide manufacturer's written installation instructions including proper material storage, material handling, installation sequence, panel location(s), and attachment methods, details and required trim and accessories.
- G. Closeout Submittals
 1. Refer to Section **[01 78 00 Closeout Submittals]** [Insert section number and title].

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation meeting: Conduct a pre-installation meeting at the job site attended by Owner, Architect, Manufacturer's Technical Representative, Panel Installer, and Contractors of related trades. Coordinate structural support requirements in relation to roof panel system, installation of any separate air/water barriers, treatment of fenestration, and other requirements specific to the project.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have a minimum of ten (10) years experience in the production of metal roof panels. Manufacturer shall demonstrate past experience with examples of projects of similar type and exposure.
- B. Installer Qualifications: Installer shall be authorized by the manufacturer and the work shall be supervised by a person having successfully completed a manufacturer training seminar regarding proper installation of the specified product.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section [01 60 00 Product Requirements] [Insert section number and title].
- B. Deliver panel materials and components in manufacturer's original, unopened, undamaged packaging with identification labels intact.
- C. Store roof panel materials on dry, level, firm, and clean surface. Elevate one end of bundle to allow moisture run-off, cover and ventilate to allow air to circulate and moisture to escape.

1.7 WARRANTY

- A. Refer to Section [01 78 36 Warranties] [Insert section number and title].
- B. Material Warranty: Standard form in which manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period. The items covered by the warranty include structural performance and finish performance.

1. Warranty Period: Two (2) years from date of Substantial Completion.

- C. Finish Warranty: Standard form in which manufacturer agrees to repair or replace metal panels that evidence deterioration of fluoropolymer finish, including flaking or peeling from approved primed metal substrate, chalk in excess of 8 when tested in accordance with ASTM D4214, Method A, and /or color fading in excess of 5 ΔE Hunter units on panels when tested in accordance with ASTM D2244.

1. Warranty Period: Twenty (20) years from date Substantial Completion, or 20 years and 3 months from the date of shipment from manufacturer's plant, whichever occurs first.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Morin - a Kingspan Group Company; 685 Middle Street, Bristol, Connecticut 06010-8416; 1-800-640-9501 (Toll Free); (www.morincorp.com)
- B. Basis of Design: "Exposed Fastener Roof Panels".
- C. Substitution Limitations:
 - 1. Submit written request for approval of substitutions to the Architect [a minimum of [14] days prior to the date for receipt of bids] [Insert time period]. Include the following information:
 - a. Name of the materials and description of the proposed substitute.
 - b. Drawings, cut sheets, performance and test data.
 - c. List of projects similar scope and photographs of existing installations.
 - d. Other information necessary for evaluation.
 - 2. After evaluation by Architect, approval will be issued via addendum. No verbal approval will be given.
 - 3. Substitutions following award of contract are not allowed except as stipulated in Division 01 – General Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Water Penetration under Static Pressure: Provide metal roof panel systems designed to resist penetration of water under static pressure. Testing shall be based on ASTM E331. Roof panels when tested shall have no water leakage at 12 pounds per square foot.
- B. Air Infiltration: Provide metal roof panel assemblies designed to resist air infiltration. Testing shall be done based on ASTM E283. Roof panels when tested shall have a maximum air leakage of 0.007 cfm per square feet of fixed roof area at a minimum static air-pressure differential of 6.24 foot pounds per square foot.
- C. Finish Characteristics:
 - 1. Gloss: 15 +/- 5 tested in accordance with ASTM D523
 - 2. Pencil Hardness: HB – H tested in accordance with ASTM D3363
 - 3. Flexibility, T-Bend: 1-2T bend tested in accordance with ASTM D4145
 - 4. Flexibility, Mandrel: No cracking tested in accordance with ASTM D522
 - 5. Adhesion: No adhesion loss tested in accordance with ASTM D3359
 - 6. Reverse Impact: No cracking or adhesion loss tested in accordance with ASTM D2794

7. Abrasion Resistance: 65 +/- 10 liters tested in accordance with ASTM D968
8. Graffiti Resistance: Minimal effect
9. Acid Pollutant Resistance: No effect tested in accordance with ASTM D1308
10. Salt Fog Resistance: Passes 1000 hours tested in accordance with ASTM B117
11. Cyclic Salt Fog and UV Exposure: Passes 2016 hours tested in accordance with ASTM D5894
12. Humidity Resistance: Passes 1500 hours when tested in accordance with ASTM D2247 and D714
13. Color Retention: Passes 5000 hours when tested in accordance with ASTM G153 and G154
14. Chalk Resistance: Maximum chalk is a rating of 8 when tested in accordance with ASTM D4214, Method A
15. Color Tolerances: Greater than 5ΔE units on panels when tested in accordance with ASTM D2244.

D. Energy Performance:

1. Energy Star Qualified: Metal panels shall meet the requirements of Energy Star Roofing Products for [low-slope] [steep slope].
2. Solar Reflectance Index (SRI): Panels shall have a solar reflectance Index of not less than [78 for low-sloped roofs] [29 for steep sloped roofs].

2.3 ROOF PANEL MATERIALS

A. Steel:

1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792, Class AZ50 coating designation, Grade 40.
2. Gauge: [24] [22] [20] [18]

B. Aluminum:

1. Coil Stock meeting ASTM B209; Alloy and temper as required for forming operations.
2. Gauge: [0.032] [0.040] [0.050] inch.

C. Stainless Steel Sheet:

1. ASTM A240or ASTM A666, [Type 304, dead soft, fully annealed] [Type 316, dead soft, fully annealed].
2. Gauge: [24] [22]

D. Copper:

1. Sheet stock meeting ASTM B370, cold-rolled, H00 or H01 temper.
2. Thickness: [16] [20] ounce per square foot.

E. Rheinzink Sheets:

1. Sheet stock meeting DIN EN1179, consisting of Zinc with copper and titanium additives in accordance with DIN EN988.
2. Thickness: [0.7] [0.8] [1.0] [1.2] mm.

2.4 ROOF PANELS

A. Roof Panel Descriptions:

1. Panel Width: 24 inches
2. Profile: [O-24*] [O-24W]
3. Thickness: 4 inches

4. Panel Width: 28 inches
5. Profile: BR-28*
6. Thickness: 1 ½ inch

7. Panel Width: 30 inches
8. Profile: E-30*
9. Thickness: 1 inch

10. Panel Width: 36 inches
11. Profile: MR-36*
12. Thickness: 3 inch

13. Panel Width: 36 inches
14. Profile: [Y-36*] [BR9-36]
15. Thickness: 1 1/2 inch

16. Panel Width: 36 inches
17. Profile: [E-36] [VB-36]
18. Thickness: 1 inch

19. Panel Width: 34 1/8 inches
20. Profile: VB-34
21. Thickness: 1 ¾ inch

22. Panel Width: [35] [29] inches
23. Profile: [BR7-35] [Y-29]
24. Thickness: 1 ½ inch

25. Panel Width: 40 inches
26. Profile: E8-40
27. Thickness: 1 inch

28. Panel Width: [37 5/16] [29 5/8] inches
29. Profile: [C-37-7/8*] [C-29-7/8*]

30. Thickness: 7/8 inch

2.5 INSULATION

- A. Refer to Section [07 21 00 - Thermal Insulation] [Insert section number and title].

2.6 ACCESSORIES

- A. Roof panel accessories: Provide accessories as required for a complete installation. Accessories shall be as indicated on approved shop drawings and per manufacturer's approved standard details. Match material and finish of metal roof panels.
1. Fasteners: Fasteners with neoprene washers as recommended by manufacturer. Fastener head shall match exposed panel color.
 2. Closure Strips: Provide closed cell closure strips, minimum 1 inch thick matching metal roof panel profile.
- B. Flashing and Trim:
1. Fabricate flashing and trim from same material as roof panels, minimum 0.018 inches thick. Finish to match metal roof panels.
 2. Locations include, but are not limited to the following: Drips, eave and rake edges, roof penetrations, hips, and valleys.
 3. [Flashing and Trim shall be provided under Section 07 62 00 - Sheet Metal Flashing and Trim".]
- C. Metal Framing:
1. General: ASTM C645, cold-formed metallic-coated steel sheet, [ASTM A653, G40 hot-dip galvanized] [ASTM A653, G60 hot-dip galvanized].
 2. Hat-Shaped, Rigid Furring Channels:
 - a. Nominal Thickness: [As indicated on Drawings] [0.025 inch] [0.040 inch] [Insert thickness].
 - b. Depth: [As indicated on Drawings] [7/8 inch] [1-1/2 inches] [Insert depth].
- D. Panel Sealant:
1. Joint Sealant: ASTM C920 as recommended in writing by metal roof panel manufacturer.

2.7 FABRICATION

- A. Metal roof panels shall be formed to lap with edges of adjacent panels which are then mechanically attached through panel to supports using fasteners with a neoprene washer. Fastener head shall match roof panel finish.
- B. Fabricate metal roof panels with joints between panels designed to form weathertight seals.
- C. Panels shall be factory formed. Field formed panels are not acceptable.
- D. Curved roof panels: Panels shall be factory curved as approved by manufacturer.
- E. [Trim Accessories: Fabricate steel trim accessories to comply with recommendations outlined in SMACNA's "Architectural Sheet Metal Manual".]

2.8 FINISHES

- A. [Steel] [Aluminum]:
 - 1. Finish and Color:
 - a. Color:
 - 1) Exposed Surface: [Selected from current Morin Metal Roof Panel color chart] [Custom color as selected by Architect] [Color indicated].
 - 2) Concealed Surface: [Manufacturer's standard primer] [Selected from current Morin Metal Roof Panel color chart] [Custom color as selected by Architect] [Color indicated].
 - b. Finish System:
 - 1) [1.0 mil. Fluoropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70%) SOLID color coat.]
 - 2) [1.0 mil. Fluoropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70%) MICA color coat.]
 - 3) [1.5 mil. Fluoropolymer (PVDF) Three Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70%) METALLIC color coat and .5 mil clear coat.]
 - 4) [2.4 mil. Fluoropolymer (PVDF) Three Coat system: 0.8 mil primer with 0.8 mil Kynar 500 (70%) SOLID color coat and 0.8 mil clear coat.]
 - B. Exposed Aluminum-Zinc Alloy-Coating; ASTM A792, Class AZ50 coating. "Galvalume" or "Zincalume" protective coating.

- C. Stainless Steel: [2D (dull, cold rolled)] [2B (bright, cold rolled)] [4 (polished directional satin)]
- D. Copper: Natural.
- E. Rheinzink: [Pre-weathered "Graphite-Grey"] [Pre-weathered "Blue-Grey"]

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Provide field measurements to manufacturer as required to achieve proper fit of the metal roof panels to building envelope. Measurements shall be provided in a timely manner so that there is no impact to construction or manufacturing schedule.
- B. Supporting Steel: All structural supports required for installation of panels shall be by others. Support members shall be installed within the following tolerances:
 - 1. Plus or minus 1/8 inch in 5 feet in any direction along plane of framing.
 - 2. Plus or minus 1/4 inch cumulative in 20 feet in any direction along plane of framing.
 - 3. Plus or minus 1/2 inch from framing plane over entire roof.
- C. Examine individual panels upon removing from the bundle; notify manufacturer of panel defects. Do not install defective panels.

3.2 PANEL INSTALLATION

- A. [Apply sealant to joints per manufacturer's recommendations and approved shop drawings.]
- B. Install panels level, and true-to-line to dimensions and layout indicated on approved shop drawings.
- C. Installation shall be in accordance with manufacturer's installation guidelines and recommendations. Roof panels shall be installed weathertight, without distortion, buckles or waves.
- D. Cutting and fitting of panels shall be neat, square and true. Torch cutting is prohibited.

3.3 FLASHING AND TRIM INSTALLATION

- A. Place flashing, trim and fasteners only as indicated per details on the approved shop drawings.
- B. Apply sealant tape at trim, per manufacturer's details and approved shop drawings, for weathertight installation.

3.4 CLEANING AND PROTECTION

- A. Remove protective film immediately after installation.
- B. Touch-up, repair or replace metal panels and trim that have been damaged.
- C. After metal roof panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

END OF SECTION

DISCLAIMER:

Morin Metal Panels Guide Specifications have been written as an aid to the professionally qualified Specifier and Design Professional. The use of this Guideline Specification requires the sole professional judgment and expertise of the qualified Specifier and Design Professional to adapt the information to the specific needs for the Building Owner and the Project, to coordinate with their Construction Document Process, and to meet all the applicable building codes, regulations and laws. MORIN METAL PANELS EXPRESSLY DISCLAIMS ANY WARRANTY, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OF THIS PRODUCT FOR THE PROJECT.